U.S. DOE Zero Energy Ready Home Program
Multifamily California Program Version 2
Rater Checklist ***DRAFT***

This Checklist is only for use in the State of California.

Raters are reminded that these checklist items must be completed in addition to the items required by ENERGY STAR Multifamily New Construction California Version 1.4 and Indoor airPLUS. Overlapping requirements are not repeated in this checklist.[1]
Throughout these requirements there are references to various standards, including the California 2022 Title 24, Building Energy Efficiency Standards (BEES), which may be accessed at energy.ca.gov.

Home Address:	City:	Permit Date:		
1. Partnership Status		**Must Correct**	**Rater [2] Verified**	**Exception or Alternate Used [3] (Enter end note #)**
1.1 Rater has verified that builder is a registered DOE ZERH Builder Partner and identified the builder's Partner ID.[4]				
2. ENERGY STAR Multifamily New Construction Baseline				
2.1 Unit is certified under ENERGY STAR Multifamily New Construction, California Version 1.4.[5]				
3. Building Envelope				
3.1 Windows in dwelling units meet high performance requirements based on climate zone.[6]				
4. Duct System				
4.1 All heating and cooling distribution ducts and heating and the space-conditioning system air handler serving dwelling units are located within the thermal and air barrier boundary.[7]				
5. Water Heating Efficiency				
5.1 Hot water distribution system HWDS qualifies as Compact HWDS (2022 BEES RA4.4.6) for units with in-unit water heaters ***or*** hot water delivery systems (in-unit or central) meet stored volume criteria.[8]				
5.2 WaterSense labeled fixtures for dwelling unit showerheads, bath faucets, and aerators.				
5.3 In-dwelling unit recirculation systems use on-demand controls.[9]				
5.4 Buildings with a continuously operating central recirculation loop comply with 2022 BEES Table 160.4-A (Mandatory Requirements for Water Heating Systems – Pipe Insulation Thickness – Multifamily Domestic Hot Water).				
6. Lighting & Appliances				
6.2 All builder-supplied and builder-installed in-dwelling refrigerators,[10] dishwashers, clothes washers, and clothes dryers are ENERGY STAR certified.[11,]				
6.2 100% of builder-installed lighting fixtures and lamps (bulbs) are LEDs.[12]				
6.3 All installed bathroom ventilation fans are ENERGY STAR certified.[13]				
7. Indoor Air Quality				

This Checklist is only for use in the State of California.

7.1 Certified under EPA Indoor airPLUS.[14]			
7.2 Energy efficient balanced ventilation (HRV or ERV) is provided in IECC Climate Zones 6 – 8.[15]			
8. Renewable Ready			
8.1 Provisions of the DOE ZERH Program, Multifamily National Program Version 2, PV-Ready Checklist are completed.			
9. Electric Vehicle Ready			
9.1 Provisions of the DOE ZERH Program, Multifamily National Program Version 2, EV-Ready Checklist are completed.			
10. Heat Pump Water Heating Ready			
10.1 Dwelling units with in-unit water heaters meet minimum space requirements.[16]			
10.2 Dwelling units with in-unit water heaters have a condensate drain installed within three feet of existing water heater.[17]			
11. Heat Pump Space Heating Ready			
11.1 Dwelling units with in-unit gas or propane heating systems comply with 2022 BEES Section 160.9(a): Mandatory Requirements for Electric Ready Buildings – Heat pump space heater ready.			
12. Energy Efficiency Threshold			
12.1 Compliance Margin (determined using the Time Dependent Valuation methodology, TDV) is greater than 15% compared to the Efficiency Compliance total of the Standard Design (determined using TDV).			

Inspection Signoffs		
Rater Name: _____ Rater Company Name: _____	Rater Pre-Drywall Inspection[18] Date(s): _____	Rater Initials: _____
Rater Name: _____ Rater Company Name: _____	Rater Final Inspection[19] Date(s): _____	Rater Initials: _____
Builder/Developer Employee: _____ Builder/Developer Name: _____	Builder Inspection Date(s): _____	Builder Initials: _____
Licensed Professional: _____	LP Inspection Date(s): _____	LP Initials: _____

This Checklist is only for use in the State of California.

Endnotes:

The following endnotes are intended to relate the same exemptions and clarifications as noted in the ZERH MF V2 California Program Requirements. However, if there are any inconsistencies the end notes in the ZERH MF V2 California Program Requirements shall take precedence.

---

[1] This Checklist applies to all dwelling units, sleeping units, common spaces, and garages (open or enclosed) in the building being certified, and where specified, parking lots. These requirements do not apply to parking garages or lots where the cost of the energy use of the parking garage or lot is not the responsibility of the Builder/Developer, Building Owner or Property Manager. This Checklist does not apply to commercial or retail spaces. This Checklist does not apply to common spaces that are located in buildings on the property without any dwelling or sleeping units. A 'sleeping unit' as defined by ANSI / RESNET / ICC 301, is a room or space in which people sleep, which can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Where the term 'dwelling unit' is used in this Checklist, the requirement is also required of 'sleeping' units. The term 'building' refers to a structure that encompasses dwelling/sleeping units and (if present) common spaces, sharing one or more of the following attributes: a common street address, a common entrance or exit, central/shared mechanical systems, or structurally interdependent wall or roof systems. Attached structures such as townhouses and 4-story two-unit structures (commonly referred to as "2-over-2s") may be considered separate buildings if they are divided by a vertical fire separation wall from the foundation to the roof sheathing and share none of the other attributes listed above. A skyway or a breezeway that connects two structures is not considered a common entrance or exit.

[2] The term 'Rater' refers to the person(s) completing the third-party verification required for certification. The person(s) shall: a) be a Certified Rater as defined below; and, b) have attended and successfully completed a DOE-recognized training class. Raters may contact their HCO or MRO for ZERH to access this training. A Certified Rater is defined as an individual who has become qualified to conduct California HERS Ratings through certification under an HCO for ZERH recognized by DOE to implement a ZERH certification program in California or an equivalent designation as determined by a DOE-recognized MRO for ZERH.

[3] If an exception for a program requirement or an alternate compliance method is used, enter the number of the corresponding endnote from this document that lists the exception or alternate.

[4] The DOE ZERH Partner ID number for the builder may be obtained from the builder or found on the Partner Locator tool on the DOE ZERH program website.

[5] Regardless of the ENERGY STAR program version required for ENERGY STAR certification, ZERH Multifamily California requires certification to ENERGY STAR Multifamily New Construction California Version 1.4.

[6] Windows shall meet selected U-factor and RSHGC specifications of 2022 BEES Table 170.2-A Envelope Component Package, "Fenestration" as noted in the chart below.

Window Type	Window Property	CA Climate Zone									
		1	2	3	4	5	6	7	8	9 – 15	16
NAFS 2017 Performance Class AW	Maximum U-factor	0.38	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.38
	Maximum RSHGC (≤3 habitable stories)	NR	0.24	NR	0.24	0.24	0.24	0.24	0.24	0.24	NR
	Maximum RSHGC (≥4 habitable stories)	0.35	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
All Other Fenestration	Maximum U-factor	0.30	0.30	0.30	0.30	0.30	0.30	0.34	0.34	0.30	0.30
	Maximum RSHGC (≤3 habitable stories)	NR	0.23	NR	0.23	NR	0.23	0.23	0.23	0.23	NR
	Maximum RSHGC (≥4 habitable stories)	0.35	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23

RSHGC is equivalent to SHGC or may optionally be calculated using Equation 170.2-A, which accounts for exterior window shading.

The following exceptions to the ZERH Window performance criteria apply:

a. An area-weighted average of windows (per dwelling unit) shall be permitted to satisfy the U-factor requirements;
b. An area-weighted average of windows (per dwelling unit) shall be permitted to satisfy the RSHGC requirements;
c. 15 square feet of windows per dwelling unit shall be exempt from the U-factor and RSHGC requirements, and shall be excluded from area-weighted averages calculated using a) and b), above;
d. One side-hinged opaque door assembly up to 24 square feet in area shall be exempt from the U-factor requirements and shall be excluded from area-weighted averages calculated using a) and b), above;
e. Windows utilized as part of a passive solar design shall be exempt from the U-factor and RSHGC requirements and shall be excluded from area-weighted averages calculated using a) and b), above. Exempt windows shall be facing within 45 degrees of true South and directly coupled to thermal storage mass that has a heat capacity > 20 btu / ft^3x°F and provided in a ratio of at least 3 sq. ft. per sq. ft. of South facing windows. Generally, thermal mass materials will be at least 2 in. thick.

Advisory: DOE is monitoring the implementation of ENERGY STAR product specifications for residential windows (V7.0), and may adopt these in a future program version update.

[7] Exceptions and alternative compliance paths:

a. Ducts and/or the space-conditioning system air handler may be located in ventilated attic spaces when the roof and ceiling insulation level from 2022 BEES Table 170.2-A, Option B are met, as specified in 2022 BEES Section 170.2(c)3Bii. Duct insulation levels must also meet the requirements in Table 170.2-K, "Duct Insulation: Ducts in Unconditioned Space."
b. Jump ducts which do not directly deliver conditioned air from the heating/cooling equipment may be located in attics if all joints, including boot-to-drywall, are air sealed and the jump duct is fully buried under the attic insulation.
c. Ducts and air-handling equipment associated with rooftop make-up air units or dedicated outdoor air systems (DOAS) that provide ventilation, and may also provide supplemental heating and cooling, are permitted to be outside of the building's thermal and air barrier boundary.

This provision does not apply to equipment or ductwork that only provides ventilation, including make-up air systems.

[8] Hot water delivery systems meet the following efficiency requirements:

To minimize water wasted while waiting for hot water and water heating energy, the hot water distribution system shall store no more than 1.8 gallons (4.5 liters) of water in any piping/manifold between the hot water source and any hot water fixture. This provision applies to in-dwelling unit plumbing systems and central hot water distribution systems. System options include manifold-fed systems; structured plumbing systems; core plumbing layouts, and recirculation systems.

To verify that the distribution system stores no more than 1.8 gallons (6.8 liters), raters shall either use the Calculation method ***or*** the Field Verification method. In the Calculation method, the rater shall calculate the stored volume between the hot water source and the furthest fixture from the source using the piping or tubing inside diameter and the length of the piping/tubing. In the case of recirculation systems, the 1.8-gallon (68 liter) storage limit shall be measured from the point where the branch feeding the furthest fixture branches off the recirculation loop, to the fixture itself. An Excel-based tool is available on the DOE ZERH website for this calculation.

Using the Field Verification method, no more than 2.0 gallons (7.6 liters) of water shall be collected from the hot water fixture before hot water is delivered. This accounts for any water stored in the fixture in addition to the 1.8-gallon limit on pipe storage. Only the fixture with the greatest stored volume between the fixture and the hot water source (or recirculation loop) needs to be tested. To field-verify that the system meets the 2.0-gallon (7.6 liter) limit, raters shall

first initiate operation of recirculation systems, if present, and let such systems run for at least 40 seconds. Next, a bucket or flow measuring bag (pre-marked for 2.0 gallons) shall be placed under the hot water fixture. The hot water shall be turned on completely and a digital temperature sensor used to record the initial temperature of the water flow. Once the water reaches the pre-marked line at 2.0 gallons, the water shall be turned off and the ending temperature of the water flow (not the collection bucket) shall be recorded. The final temperature of the water flow must increase by ≥ 10 °F in comparison to the initial temperature reading.

[9] In-dwelling unit hot water recirculation systems meet the following requirements (these provisions do not apply to recirculating central hot water distribution systems):

a. Must be based on an occupant-controlled switch or an occupancy sensor, installed in each bathroom in the dwelling unit which is located beyond a 1.8 gallon stored-volume range from the water heater or central recirculation loop.
b. In-dwelling unit recirculation systems which operate based on "adaptive" scheduling, meaning that they "learn" the hot water demand profile in the dwelling unit and adapt their operation to anticipate this profile, are permitted at this time, and do not require the use of occupant-controlled switches or occupancy sensors.
c. In-dwelling unit recirculation systems that are activated based **solely** on a timer and/or temperature sensor are not eligible.

[10] Due to industry supply chain challenges, DOE is temporarily allowing the use of non-ENERGY STAR certified refrigerators. DOE advises partners that this alternative may be rescinded in a future program update.

[11] Products in categories which are not covered by ENERGY STAR product criteria are exempt.

[12] Up to 5% of lighting, for task or decorative lighting, may be exempt from this provision.

[13] This provision does not apply to H/ERVs that are used to provide exhaust ventilation for bathrooms.

[14] Buildings permitted on or before 12/31/2024 must certify under the Indoor airPLUS Version 1 program requirements. For buildings permitted after 12/31/2024, DOE will consider a revision to these program requirements that specifies if an updated version of Indoor airPLUS must be used. See the Indoor airPLUS program site for information on program updates: https://www.epa.gov/indoorairplus/indoor-airplus-program-documents.

[15] An in-unit HRV or ERV is required to provide whole-dwelling mechanical ventilation for dwelling units in 2021 IECC Climate Zones 6 – 8 and must meet or exceed the following specifications: ≥ 65% SRE (@ 32 °F) and ≥ 1.2 CFM/Watt. Alternatively, projects may utilize centralized H/ERVs serving multiple dwelling units. Note that in California, only Mono County and Alpine County are located in Climate Zone 6, and no California counties are located in Climate Zones 7 or 8. 2021 IECC climate zones may be determined by using the published IECC at the following link: https://codes.iccsafe.org/content/IECC2021P2/chapter-3-ce-general-requirements.

[16] Each dwelling unit with an in-unit water heater has an individual branch circuit outlet that is installed, energized, and terminates within 3 feet of each installed fossil fuel water heater, and a space located within the dwelling unit that is at least 3' x 3' wide and 7' high shall be available surrounding or within 3 feet of the installed fossil fuel water heater, to facilitate future heat pump water heater installation. The individual branch circuit shall have a rating not less than 240V/30A or 120V/20A. The 3' x 3' x 7' volume may contain the existing water heater. An exception to the requirement for the 3' x 3' x 7' space is provided when the installed water heater is an electric tankless system or a fossil fuel tankless water heater.

Dwelling units utilizing an electric water heater are exempt from this requirement.

[17] Drain is no more than two inches higher than the base of the installed water heater and allows draining without pump assistance. Drain is not required to be reserved exclusively for use with a future heat pump water heater.

[18] Any Item that will be concealed by drywall (e.g., wall insulation) must be verified during the pre-drywall inspection. If drywall is installed prior to the inspection, then it must be entirely removed to fully verify all Items. It is not sufficient to remove only portions of drywall to inspect a subset of areas. Furthermore, it is not acceptable to complete a Sampled Rating on a home

that has missed the pre-drywall inspection. Additional information is available in the ENERGY STAR Technical Bulletin: Pre-Drywall Inspection Is Always Required.

[19] Some Items can typically only be verified at a later stage of construction than when the pre-drywall inspection occurs (e.g., bath fan airflow). Any Item that has not been verified during the pre-drywall inspection must be verified prior to or during the final inspection.